We claim:

1. A process for burning a sulfur-containing fuel to produce a flue gas, the process comprising:

introducing a sulfur-containing fuel into a combustion chamber;

optionally oxygen-enriching an oxidant stream;

introducing the oxidant stream into the combustion chamber and mixing it with the sulfur-containing fuel to define a combustion zone;

introducing potassium carbonate into the combustion chamber; and

burning the sulfur-containing fuel to produce the flue gas and potassium sulfate.

2. The process of Claim 1 wherein the total oxygen content of the oxidant entering the combustion chamber exceeds 21%.

3. The process of Claim 2 wherein the potassium carbonate is introduced into the combustion chamber in the combustion zone.

4. The process of Claim 2 wherein the potassium carbonate is introduced into the combustion chamber in an amount sufficient to exceed the stoichiometric requirement needed to react with the sulfur in the fuel by between 0% and 50%.

5. The process of Claim 2 wherein at least half of the sulfur in the sulfur-containing fuel is converted to potassium sulfate.

6. A process for burning a sulfur-containing fuel to produce a flue gas, the process comprising:

introducing a sulfur-containing fuel into a combustion chamber at a fuel inlet;

optionally oxygen-enriching at least one oxidant stream;

introducing a primary oxidant stream into the combustion chamber at a primary oxidant inlet positioned proximate to or coincident the fuel inlet and mixing it with the sulfur-containing fuel to define a first combustion zone;

introducing a secondary oxidant stream into the combustion chamber at a secondary oxidant inlet positioned so that the secondary oxidant enters the combustion chamber in the primary combustion zone;

introducing potassium carbonate into the combustion chamber; and

burning the sulfur-containing fuel to produce the flue gas and potassium sulfate.

7. The process of Claim 6 wherein the total oxygen content of the oxidant entering the combustion chamber exceeds 21%.

8. The process of Claim 7 wherein the total oxygen content of the primary oxidant exceeds 21%.

9. The process of Claim 7 wherein the total oxygen content of the secondary oxidant exceeds 21%.

10. The process of Claim 7 wherein at least a portion of the potassium carbonate is introduced into the combustion chamber in the primary combustion zone.

11. The process of Claim 7 wherein the potassium carbonate is introduced into the combustion chamber in an amount sufficient to exceed the stoichiometric requirement needed to react with the sulfur in the fuel by between 0% and 50%.

12. The process of Claim 7 wherein at least half of the sulfur in the sulfur-containing fuel is converted to potassium sulfate.

13. A process for burning a sulfur-containing fuel to produce a flue gas, the process comprising:

introducing a sulfur-containing fuel into a combustion chamber at a fuel inlet;

optionally oxygen-enriching at least one oxidant stream;

introducing a primary oxidant stream into the combustion chamber at a primary oxidant inlet positioned proximate to or coincident the fuel inlet and mixing it with the sulfur-containing fuel to define a first combustion zone;

introducing a secondary oxidant stream into the combustion chamber at a secondary oxidant inlet positioned so that the secondary oxidant enters the combustion chamber in the primary combustion zone;

introducing a tertiary oxidant stream into the combustion chamber at a tertiary oxidant inlet positioned away from the primary oxidant inlet and away from the secondary oxidant inlet, the tertiary oxidant entering the combustion chamber to define a secondary combustion zone;

introducing potassium carbonate into the combustion chamber; and

burning the sulfur-containing fuel to produce the flue gas and potassium sulfate.

14. The process of Claim 13 wherein the total oxygen content of the oxidant entering the combustion chamber exceeds 21%.

15. The process of Claim 14 wherein the total oxygen content of the primary oxidant exceeds 21%.

16. The process of Claim 14 wherein the total oxygen content of the secondary oxidant exceeds 21%.

17. The process of Claim 14 wherein the total oxygen content of the tertiary oxidant exceeds 21%.

18. The process of Claim 14 wherein at least a portion of the potassium carbonate is introduced into the combustion chamber in the primary combustion zone.

19. The process of Claim 14 wherein at least a portion of the potassium carbonate is introduced into the combustion chamber in the secondary combustion zone.

20. The process of Claim 14 wherein the potassium carbonate is introduced into the combustion chamber in an amount sufficient to exceed the stoichiometric requirement needed to react with the sulfur in the fuel by between 0% and 50%.

21. The process of Claim 14 wherein at least half of the sulfur in the sulfur-containing fuel is converted to potassium sulfate.

22. The process of Claim 14 wherein the potassium carbonate is introduced into the combustion chamber through the fuel inlet.

23. The process of Claim 22 wherein the total oxygen content of the primary oxidant exceeds 21%.

24. The process of Claim 23 wherein the total oxygen content of the secondary oxidant exceeds 21%.

25. The process of Claim 24 wherein the total oxygen content of the tertiary oxidant exceeds 21%.

26. The process of Claim 14 wherein the potassium carbonate is introduced into the combustion chamber through the tertiary air inlet.

27. The process of Claim 26 wherein the total oxygen content of the primary oxidant exceeds 21%.

28. The process of Claim 27 wherein the total oxygen content of the secondary oxidant exceeds 21%.

29. The process of Claim 28 wherein the total oxygen content of the tertiary oxidant exceeds 21%.

30. The process of Claim 29 wherein the potassium carbonate is introduced into the combustion chamber in an amount sufficient to exceed the stoichiometric requirement needed to react with the sulfur in the fuel by between 0% and 50%.

31. The process of Claim 29 wherein at least half of the sulfur in the sulfur-containing fuel is converted to potassium sulfate.

32. A process for burning a sulfur-containing fuel to produce a flue gas, the process comprising:

introducing a sulfur-containing fuel into a combustion chamber at a fuel inlet;

introducing a primary oxidant stream containing more than 21% oxygen into the combustion chamber at a primary oxidant inlet positioned proximate to or coincident the fuel inlet and mixing it with the sulfur-containing fuel to define a first combustion zone;

introducing a secondary oxidant stream containing more than 21% oxygen into the combustion chamber at a secondary oxidant inlet positioned so that the secondary oxidant enters the combustion chamber in the primary combustion zone;

introducing a tertiary oxidant stream containing more than 21% oxygen into the combustion chamber at a tertiary oxidant inlet positioned away from the primary oxidant inlet and away from the secondary oxidant inlet, the tertiary oxidant entering the combustion chamber to define a secondary combustion zone;

the total oxygen content of the oxidant entering the combustion chamber exceeding 21%;

introducing potassium carbonate into the combustion chamber through the tertiary air inlet in an amount sufficient to exceed the stoichiometric requirement needed to react with the sulfur in the fuel by between 0% and 50%; and

burning the sulfur-containing fuel to produce the flue gas and potassium sulfate; wherein at least half of the sulfur in the sulfur-containing fuel is converted to potassium sulfate.